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(54) Printed transfer sheet for fabric decorating

(57) There is provided a method of producing a patterned substrate from which fabric may be decorated wherein a pattern produced using a suitably programmed computer is printed onto a substrate from which fabrics may be printed, the pattern being printed on the substrate by means of a computer-linked printer, e.g. an ink jet printer in which transfer dyes are used. Using this technique, fabrics, especially hosiery, can be produced having a diverse range of patterns and the overall production process is greatly shortened and is less costly for the small producer.

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## SPECIFICATION

## Fabric decorating

- 5 This specification relates to improvements in or relating to the decoration of fabrics. More particularly it includes a new method of preparing a patterned substrate which may then be used to produce a printed fabric. The disclosure is of especial relevance, though need not in principle be limited, to the production of printed hosiery. 5

- One of the most widely used methods for producing patterned fabrics, particularly patterned hosiery, comprises overlaying the fabric to be printed with transfer printed paper and then applying heat and pressure to the back of the paper so as to cause the print or artwork to be transferred to the fabric. Such a procedure works reasonably well but despite its wide acceptance it still suffers from a number of drawbacks. 10

- Firstly, the transfer printed paper has to be bought from the mass manufacturers by the very large roll. Such rolls cost, depending on the complexity of the pattern, anything from £850 to £3000 at today's prices. 15  
Given the relatively long, thin shape of the template used on which hosiery is printed, there can be, and frequently is, substantial wastage of the patterned transfer printed paper, which makes the process rather expensive. For the small manufacturer, the start-up cost is very high because of the number of rolls of different papers he will want to have in order to provide a range.

- Secondly, because of the expense of producing the transfer print rolls, the roll manufacturers are very reluctant to introduce new and interesting designs. The cost of producing rolls of a new design, with the uncertainty of whether or not it will be fashionable, tends to result in a rather limited number of designs being available. 20

- I have now devised a new method for producing the patterned substrate, generally paper, from which the fabrics may be decorated. The textile industry has, in common with many other industries, taken to the computer as an aid to design, and modern design computers in the right hands enable an almost infinite variety of interesting designs to be created. In my proposals, by replacing with different transfer dyes the coloured inks in the printing mechanism of a conventional ink-jet colour printer linked to a design computer, newly created designs or patterns can be 'printed' onto a reasonably robust substrate, e.g. paper, and the patterned paper can then be overlaid the fabric template prior to the application of heat and pressure in a conventional manner to transfer the new pattern to the fabric. The whole procedure from creation of the design via 'printing' it out to its transfer to a fabric, especially hosiery, takes very little time, and more of the same design is instantly available from the computer when needed. In this way, smaller production runs of articles carrying new highly individual designs can be carried out, providing greater interest and individuality to the finished article; this is practically impossible to achieve using conventional mass-produced transfer-printed paper because of the sheet cost and would be of great benefit to the smaller scale manufacturer whose competitiveness relied on more striking individuality. 25 30 35

- In a further embodiment, the new design may be created within the computer to be within an outline of the shape of the article to be printed upon. The design may then be printed out and the design, already in the shape of the article it is desired to decorate may then be cut out. This avoids wasting any printed design material and saves further cost for the small manufacturer. 40

- Any of a number of the computers currently available to the textile industry for the creation and modification of designs may be employed, the hardware generally comprising a digitiser, computer itself, colour monitor and a choice of output systems including colour printer. As stated above, such printers as are conventionally used employ an ink-jet printer and the final ink print-out of any new design that is created is unsuitable for further use in any manufacturing process. In my invention, substitution of transfer dyes for the ink changes the whole outlook and provides far greater flexibility. 45

- Examples of companies who sell design computers which may be used include Victor (e.g. the VPC 2), Tandem and Hewlett-Packard. Such companies can also provide appropriate and compatible design software for full design capability, and a suitable pack is the IBM PC. Such computers may employ either dedicated ink-jet colour printers or other printers such as an ACT printer sold by Pragma, St. Albans, Herts, or a Xerox 4020, using a suitable interface. Suitable combinations will readily be apparent to any skilled designer but the ACT and Xerox printers are capable of forming a large number of colours and this is highly useful. 50

Transfer dyes in liquid form which might be used in the printers include

- |    |                    |       |                              |      |    |
|----|--------------------|-------|------------------------------|------|----|
| 55 | Dispersal Yellow   | B6GNT | Colour Index Disperse Yellow | 218; | 55 |
|    | Dispersal Yellow   | BGR   | Colour Index Disperse Yellow | 39;  |    |
|    | Dispersal Orange   | BA    | Colour Index Disperse Orange | 1;   |    |
|    | Dispersal Red      | B2B   | Colour Index Disperse Red    | 60;  |    |
| 60 | Dispersal Blue     | BG    | Colour Index Disperse Blue   | 26;  | 60 |
|    | and Disperse Black |       | BT or Disperse Black BGY     |      |    |

All the above are obtainable from ICI plc, Manchester. Other preparations may well suggest themselves to someone skilled in the field, including fluorescent transfer dyes.

- 65 The designs will be printed onto a suitably receptive but robust substrate from which they can subsequ- 65

ently be transferred to a fabric. White paper, e.g. at a paper weight of from about 50 to 80 g/m<sup>2</sup> such as cartridge paper has been found a suitable substrate and after 'printing', the design dries and is then able to be used.

5 The design may be transferred from its backing substrate to the fabric by conventional means, using heat and pressure. Typical apparatus for achieving this and in which the temperature, pressure and time are adjustable, include flat bed Printing and Fusion presses such as the Mk.9, sold by A. Adkins & Sons Limited, South Wigston, Leicester, though other types are available. Temperature is usually adjustable from 50 to 250°C and the time from 0 to 60 seconds. 5

10 A typical temperature of about 210°C applied for about 30 seconds has been found particularly suitable for printing 15 denier nylon/polyester hosiery. These ranges will naturally depend upon the nature of the material being 'printed' and can readily be varied for different materials, fabrics, fabric thicknesses and the like by simple experimentation. It is naturally important that the properties of the base fabric should not be altered during the 'printing' step. 10

Using such apparatus, fabric articles mounted on a conventional planar template, particularly hosiery, can 15 if desired be printed either on one side, by normal overlaying techniques, or on both sides by 'sandwiching' the article between a pair of patterned substrates, followed by application of the appropriate heat and pressure for the desired period. 15

#### CLAIMS 20

- 20 1. A method of producing a patterned substrate from which fabric may be decorated wherein a pattern produced using a suitably programmed computer is printed onto a substrate from which fabrics may be printed, the pattern being printed on the substrate by means of a computer-linked printer in which transfer dyes are used.
- 25 2. A method as claimed in claim 1 wherein the computer is linked to an ink-jet printer in which transfer dyes are used. 25
3. A method as claimed in claim 1 or claim 2 wherein the patterned substrate that is produced is a paper from which the pattern can be transferred to the fabric it is desired to decorate.
4. A method as claimed in any one of claims 1 to 3 wherein the patterned substrate is a cartridge paper 30 having a paper weight of from 50 to 80 g/m<sup>2</sup>. 30
5. A method as claimed in any one of claims 1 to 4 wherein the pattern produced by the computer on the substrate is within an outline of the shape of the fabric to which it is desired to transfer the pattern.
6. A method as claimed in claim 1 substantially as hereinbefore described.
7. A method of decorating fabric which comprises applying heat and pressure to a patterned substrate 35 whereby the pattern is transferred to the fabric, the patterned substrate being produced by a method as claimed in claim 1. 35
8. A method as claimed in claim 7 wherein the fabric that is decorated is hosiery.
9. A method as claimed in claim 7 substantially